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EXAMINER	
BURGESS, BARBARA N	
ART UNIT	**PAPER NUMBER**
2157	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/077,696	SHAH ET AL.	
	Examiner	Art Unit	
	Barbara N. Burgess	2157	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5-29-07*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *5-29-07* .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Amendment filed May 29, 2007. Claims 1-23 are presented for further examination. Claims 24-26 are newly added and presented for initial examination.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-13, 15-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenau et al. (hereinafter "Blum", US Patent No. 6,421,711 B1) in view of Gunlock et al. (hereinafter "Gunlock", US Patent 6,952,734 B1).

As per claim 1, Blum discloses a storage server in a storage area network connecting a plurality of host computers and a plurality of storage devices, said storage server comprising:

- A plurality of storage processors associated with said plurality of host computers and said plurality of storage devices, wherein said plurality of storage processors receives a plurality of command packets and a plurality of data packets (column 6, lines 65-67, column 7, lines 1-9, column 9, lines 36-56);

- A switching circuit connecting said plurality of storage processors (column 8, lines 3-15, 46-50, 58-65, column 9, lines 44-55, column 10, lines 1-15;);
- A first micro engine, wherein said first micro engine is configured to execute a first process comprising:

  configuring a path between a first storage processor and a second storage processor of said plurality of storage processors, via said switching circuit, in accordance with a command packet of said plurality of command packets (column 9, lines 20-55, column 11, lines 56-65, column 12, lines 12-30, column 13, lines 45-57).

Blum does not explicitly disclose:

- routing a data packet of said plurality of data packets over said path, prior to completely receiving said data packet, between said first storage processor and said second storage processor via said switching circuit.

However, in an analogous art, Gunlock discloses data transmitted between machines is divided into chunks of size. Each chunk is typically packaged with a header and a trailer for transmission. In Fibre-Channel, packets are known as frames. There may be more than one possible path, or sequence of links, loops, etc. that may be traversed by a frame between two nodes. The driver uses network information to determine header information and routing for the one or more fiber channel network frames or packets according to commands. The driver must determine an appropriate destination and routing for each frame required to implement a command, and transmit those frames

over a port appropriate for that routing (column 1, lines 30-34, 61-64, column 2, lines 35-41, 49-62, column 6, lines 56-62, column 7, lines 15-24).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Gunlock's routing a data packet of said plurality of data packets over said path, prior to completely receiving said data packet, between said first storage processor and said second storage processor via said switching circuit in Blum's method in order to provide extra capacity or redundancy to protect against switch, node, or line failures.

As per claim 2, Blum discloses the storage server of claim 1, wherein said first storage processor includes a lookup table that associates one or more virtual logical unit numbers (VLUNs) with one or more physical logical unit numbers (PLUNs), wherein said one or more PLUNs are associated with said plurality of storage devices, and wherein said one or more VLUNs are visualizations of said one or more PLUNS (column 25, lines 32-50, 54-67).

As per claim 3, Blum discloses the storage server of claim 1, wherein said micro engine is a component of the first storage processor (column 17, lines 9-35).

As per claim 4, Blum discloses the storage server of claim 1, further comprising:

- A plurality of micro engines, wherein said plurality of micro engines are components of said plurality of storage processors (column 17, lines 9-35).

As per claim 5, Blum discloses the storage server of claim 1, wherein said plurality of data packets are received from one of said plurality of host computers (column 7, lines 21-25).

As per claim 6, Blum discloses the storage server of claim 1, wherein said plurality of data packets are received from one of said plurality of storage devices (column 7, lines 28-35).

As per claim 7, Bum discloses the storage server of claim 1, wherein said plurality of data packets are received from more than one of said plurality of storage devices (column 7, lines 25-40).

As per claim 8, Blum discloses the storage server of claim 1, wherein said plurality of data packets are routed to one of said plurality of host computers (column 8, lines 63-67).

As per claim 9, Blum discloses the storage server of claim 1, wherein said plurality of data packets are routed to one of said plurality of storage devices (column 7, lines 28-35).

As per claim 10, Blum discloses the storage server of claim 1, wherein said plurality of data packets are routed to more than one of said plurality of storage devices (column 3, lines 63-67, column 4, lines 25-35, column 5, lines 63-67, column 6, lines 3-8).

As per claim 11, Blum discloses the storage server of claim 1further comprising a second microengine configured to execute a second process comprising:

- Configuring a plurality of paths between the second storage processor and a storage device of the plurality of storage devices in accordance with said command packet (column 13, lines 40-57).

As per claim 12, Blum discloses the storage server of claim 1, wherein said first storage processor receives said command packet from one of said plurality of host computers (column 9, lines 43-55).

As per claim 13, Blum discloses the storage server of claim 1, wherein said first storage processor receives said command packet from one of said plurality of storage processors (column 10, lines 34-40).

As per claim 15, Blum discloses the storage server of claim 1, wherein said first storage processor passes a handle to said second storage processor (column 10, lines 35-45).

As per claim 16, Blum discloses the storage server of claim 1, wherein said first storage processor and said second storage processor are a single storage processor (column 7, lines 23-27).

As per claim 17, Blum discloses the storage server of claim 1, wherein said first micro engine routes said data packet according to a routing tag therein (column 13, lines 40-50)

As per claim 18, Blum discloses the storage server of claim 1, further comprising:

- A virtual server controller configured to program, via a configuration command, a lookup table in one of said plurality of storage processors, wherein said lookup table associates one or more virtual logical unit numbers (VLUNs) with one or more physical logical unit numbers (PLUNs) (column 25, lines 32-50, 54-67).

As per claim 19, Blum discloses a method of routing data in a storage area network connecting a storage server between a plurality of host computers and a plurality of storage devices, said storage server having a plurality of storage processors and a switching circuit, said plurality of storage processors receiving a plurality of command packets and a plurality of data packets, said method comprising:

- Configuring a path between a first storage processor and a second storage processor of said plurality of storage processors, via said switching circuit, in

accordance with a command packet of said plurality of command packets (column 9, lines 20-55, column 11, lines 56-65, column 12, lines 12-30, column 13, lines 45-57).

Blum does not explicitly disclose:

- routing a data packet of said plurality of data packets over said path, prior to completely receiving said data packet, between said first storage processor and said second storage processor via said switching circuit.

However, in an analogous art, Gunlock discloses data transmitted between machines is divided into chunks of size. Each chunk is typically packaged with a header and a trailer for transmission. In Fibre-Channel, packets are known as frames. There may be more than one possible path, or sequence of links, loops, etc. that may be traversed by a frame between two nodes. The driver uses network information to determine header information and routing for the one or more fiber channel network frames or packets according to commands. The driver must determine an appropriate destination and routing for each frame required to implement a command, and transmit those frames over a port appropriate for that routing (column 1, lines 30-34, 61-64, column 2, lines 35-41, 49-62, column 6, lines 56-62, column 7, lines 15-24).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Gunlock's routing a data packet of said plurality of data packets over said path, prior to completely receiving said data packet, between said first storage processor and said second storage processor via said switching circuit in Blum's method in order to provide extra capacity or redundancy to protect against switch, node, or line failures.

As per claim 20, Blum discloses the method of claim 19, wherein routing said data packet over said path comprises routing said data packet to one of said plurality of host computers (column 2, lines 45-55).

As per claim 21, Blum discloses the method of claim 19, wherein routing said data packet over said path comprises routing said data packet to one of said plurality of storage devices (column 2, lines 60-67).

As per claim 22, Blum discloses the method of claim 19, wherein routing said data packet over said path comprises routing said data packet to more than one of said plurality of storage devices (column 3, lines 20-33).

As per claim 23, Blum discloses the method of claim 19, further comprising configuring a plurality of paths between the second storage processor and a storage device of the plurality of storage devices in accordance with said command packet (column 8, lines 27-55).

As per claim 24, Blum discloses a method of routing data in a storage area network connecting a storage server between a plurality of host computers and a plurality of storage devices, said storage server having a plurality of storage processors and a

switching circuit, said plurality of storage processors receiving a plurality of command packets and a plurality of data packets, said method comprising:

- configuring a path between a first storage processor and a second storage processor of said plurality of storage processors, via said switching circuit, in accordance with a command packet of said plurality of command packets (column 9, lines 20-55, column 1, lines 56-65, column 12, lines 12-30, column 13, lines 45-57);

- configuring a plurality of paths between the second storage processor and a storage device of the plurality of storage devices in accordance with said command packet (column 13, lines 40-57).

Blum does not explicitly disclose:

- routing a data packet of said plurality of data packets over said path, prior to completely receiving said data packet, between said first storage processor and said second storage processor via said switching circuit.

However, in an analogous art, Gunlock discloses data transmitted between machines is divided into chunks of size. Each chunk is typically packaged with a header and a trailer for transmission. In Fibre-Channel, packets are known as frames. There may be more than one possible path, or sequence of links, loops, etc. that may be traversed by a frame between two nodes. The driver uses network information to determine header information and routing for the one or more fiber channel network frames or packets according to commands. The driver must determine an appropriate destination and

routing for each frame required to implement a command, and transmit those frames over a port appropriate for that routing (column 1, lines 30-34, 61-64, column 2, lines 35-41, 49-62, column 6, lines 56-62, column 7, lines 15-24).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Gunlock's routing a data packet of said plurality of data packets over said path, prior to completely receiving said data packet, between said first storage processor and said second storage processor via said switching circuit in Blum's method in order to provide extra capacity or redundancy to protect against switch, node, or line failures.

As per claim 25, Blum discloses the method of claim 24, wherein the first storage processor includes a lookup table that associates one or more virtual logical unit numbers (VLUNs) with one or more physical logical unit numbers (PLUNs), wherein said one or more PLUNs are associated with said plurality of storage devices, and wherein said one or more VLUNs are virtualizations of said one or more PLUNs (column 25, lines 32-50, 54-67).

As per claim 26, Blum discloses the method of claim 24, wherein routing said data packet over said path comprises routing said data packet to one of said plurality of host computers (column 8, lines 63-67).

3. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenau et al. (hereinafter "Blum", US Patent No. 6,421,711 B1) in view of Gunlock et al. (hereinafter "Gunlock", US Patent 6,952,734 B1) and in further view of Karpoff et al. (hereinafter "Karpoff", US Patent Publication 2002/0112113 A1).

As per claim 14, Blum, in view of Gunlock, discloses the storage server of claim 1.

Blum, in view of Gunlock, does not explicitly disclose wherein said first micro engine uses a command handle in said command packet to perform a tree search to configure said path.

However, in an analogous art, Karpoff discloses a mapping structure for medium sized disk images called a B-Tree structure (paragraphs [0054, 0060]).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Karpoff's tree search in Blum's storage server in order to maintain data allowing translation of virtual block addresses to real block addresses.

Response to Arguments

The Office notes the following argument(s):

(a) Blum and Gunlock, individually or in combination, do not teach or suggest routing a data packet of said plurality of data packets over said path, prior to completely

receiving said data packet, between said first storage processor and said second storage processor via said switching circuit.

(b) Blum does not teach or suggests the limitation of configuring a plurality of paths between the second storage processor and a storage device of the plurality of storage devices in accordance with said command packet.

4. Applicant's arguments filed have been fully considered but they are not persuasive.

In response to:

(a) Gunlock teaches that data transmitted between devices are divided into chunks. Each chunk is packaged with a header and trailer into a packet for transmission. In a switched fibre channel fabric, there may be more than one path a packet can traverse between two nodes. The driver executes commands to determine routing for one or more fiber channel network frames or packets. The driver must determine an appropriate destination and routing for each frame required to implement a command, and transmit those frames over a port appropriate for that routing. Network topology information in used and maintained in order to make routing decisions. Local topology database must be updated to reflet valid devices on the network and valid paths through the network to those devices. Fibre channel systems can recognize a failure of a path and switch traffic between a pair of nodes to an alternate path. Also, each node has a node record having information required for routing frames to the node. Device record detail, path link detail, node link detail are used to control routing of frames through the network fabric prior to a frame being received (column 1, lines 30-35, 61-64, column 2,

lines 58-67, column 3, lines 18-21, 26-28, column 7, lines 15-22, 55-60, column 8, lines 12-15, 36-40, 58-65, column 9, lines 6-7).

Therefore, packets (chunks of data) can take alternative paths in accordance with commands before the packet is completely received. Gunlock indeed teaches routing a data packet of said plurality of data packets over said path, prior to completely receiving said data packet, between said first storage processor and said second storage processor via said switching circuit.

(b) Blum teaches the storage controller (second storage processor) is connected to a plurality of storage volumes (storage devices) via several storage adaptors. Each of these adaptors links a respective set of storage devices. These links (path) provide a way in which requests or data can be sent to/from the controller to the storage device (column 7, lines 9-20, column 23, lines 60-67).

Gunlock further teaches a node record containing routing information for dispatching packets from a port or to a specific target port of a target node of the storage area network. Target nodes of the storage area network may be storage nodes or processor nodes. Path information indicates which path of possibly multiple paths is an active path for which the packets should be sent (column 6, lines 18-27, column 7, lines 14-23, 55-61, column 8, lines 58-62).

Therefore, the limitation of configuring a plurality of paths between the second storage processor and a storage device of the plurality of storage devices in accordance with said command packet is taught by Blum and Gunlock.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara N. Burgess whose telephone number is (571) 272-3996. The examiner can normally be reached on M-F (8:00am-4:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Ettinene can be reached on (571) 272-4001. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Barbara N Burgess
Examiner
Art Unit 2157

August 13, 2007

ARIO ETIENNE
SUPERVISORY PATENT EXAMINER